

Switch On worksheet



The Lemon Battery

Name: _____

Teacher: _____

Class: _____

Aim:

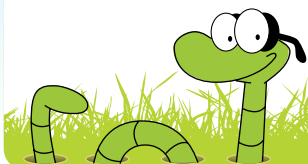
1. To build a series circuit.
2. To observe the energy changes within that circuit.
3. To familiarise students with circuit diagrams.
4. To observe that direct current travels in one direction only.

Background information

Electrical current is the flow of electrons through a conductor. A conductor is any material that allows an electric current pass through it. All metals are good electrical conductors, and so are such things as graphite and salt water.

There are two types of electrical charges positive and negative. Electrons carry a negative charge. When electrons are placed near something that has a positive charge the electrons are attracted to it and start to move. It is this movement that produces the electrical current.

Lemons are called citric fruits because they contain a substance called citric acid. The citric acid reacts chemically with the copper and the zinc. It reacts in such a way that the copper becomes positive and the zinc becomes negative. When this occurs, the electrons move a way from the zinc to the copper, in the process producing the electric current. Light emitting diodes (LED's) are electronic components that light up when there is a current flowing through them. Diodes are like electronic valves in that they only allow electric current to flow in one direction. If a diode is connected so that its long leg is attached to the positive terminal of a battery it will light up. However if it is connected the other way around it will not light up.



What you will need:

- § three fresh lemons;
- § three pieces of copper (about the size of a 10 cent piece);
- § three zinc washers,
- § paper clips, wire; and
- § LED (light emitting diode).

What to do:

- Make two slits in the skin of a lemon.
- Push a piece of copper and a zinc washer into the lemon. Repeat for the other two lemons.
- Attach the wires as shown in the diagram to make a circuit. Make sure that the long leg of the LED is attached to the piece of copper.
- Observe what happens when the long leg of the diode is attached to the piece of zinc.

Note: Look directly down on the LED to see if it lights up.

Questions

1. What is meant by direct current?
2. What is the difference between a series circuit and a parallel circuit?
3. Is your lemon battery a series or parallel circuit?
4. What could you do to increase the voltage of your lemon battery?
5. How long do you think it will keep the LED alight? (You will be surprised)

Upper primary & Lower Secondary Activity - Lemon Battery

